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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/812,959

03/31/2004

Hiroataka Komatsubara

MAE 309

4883

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08/23/2005

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WASHINGTON, DC 20005

EXAMINER

DOAN, THERESA T

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/812,959 | Applicant(s) KOMATSUBARA, HIROTAKA | |
| | Examiner Theresa T. Doan | Art Unit 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 8-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>03/31/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The prior art documents submitted by applicant in the Information Disclosure Statement filed on 03/31/04, have all been considered and made of record (note the attached copy of form PTO-1449).

Drawings

2. The drawings, filed on 03/31/04, are accepted.

Election/Restrictions

3. Applicant's election without traverse of claims 1-7 in the reply filed on 07/15/05 is acknowledged.

Claim Objections

4. Claim 3 is objected to because of the following informalities:
In claim 3, line 4, a word "have" should be changed to "having".
Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Park et al. (U.S. Pat. 6,469,392).

Park (Fig. 10) discloses a semiconductor device having a plurality of interconnecting lines (220a, 220b) (column 2, lines 1-6) disposed side by side in a dielectric film 770, each interconnecting line having a top, a bottom, and a width (column 1, lines 65-67 and column 2, lines 1-4), wherein:

the width of each interconnecting line 220 varies from the top of the interconnecting line to the bottom of the interconnecting line 220; and

each mutually adjacent pair of the interconnecting lines (220a, 220b) is separated by a substantially constant distance from the top of each of the interconnecting lines (220a, 220b) in the mutually adjacent pair to the bottom of each of the interconnecting lines (220a, 220b) in the mutually adjacent pair (See Fig. 10 labeled by the examiner below).

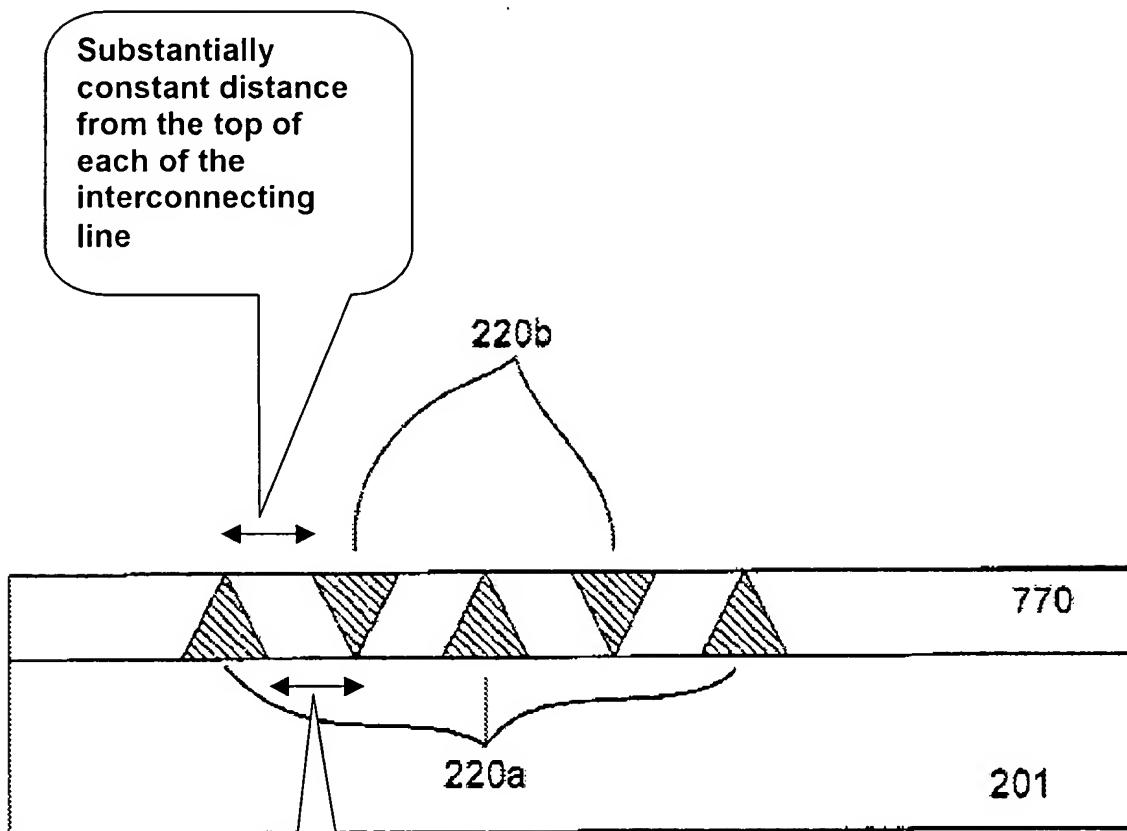


Fig. 10

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (U.S. Pat. 6,469,392) in view of Matsukawa (JP 404023327).

Regarding claims 2 and 3, as discussed in details above, Park (Fig. 10) discloses that the interconnecting lines (220a, 220b) include non-rectangular shaped cross-section in order to reduce capacitive coupling noise between adjacent lines (column 2, lines 23-25) and also to reduce line pitch for obtaining high wiring density (column 1, lines 6-8).

Park does not disclose that the non-rectangular shaped interconnecting lines (220a, 220b) comprise upright cross-section T shaped interconnecting lines disposed alternately with inverted cross-sectional T shaped interconnecting lines.

However, Matsukawa (Fig. 2a) teaches a semiconductor device including a plurality of interconnecting lines (2,3) having cross-sectional T shapes, the interconnecting lines 2 having upright cross-section T shapes are disposed alternately with interconnecting lines 3 having inverted cross-sectional T shapes in order to obtain the T shaped interconnecting lines which has high wiring density and which can

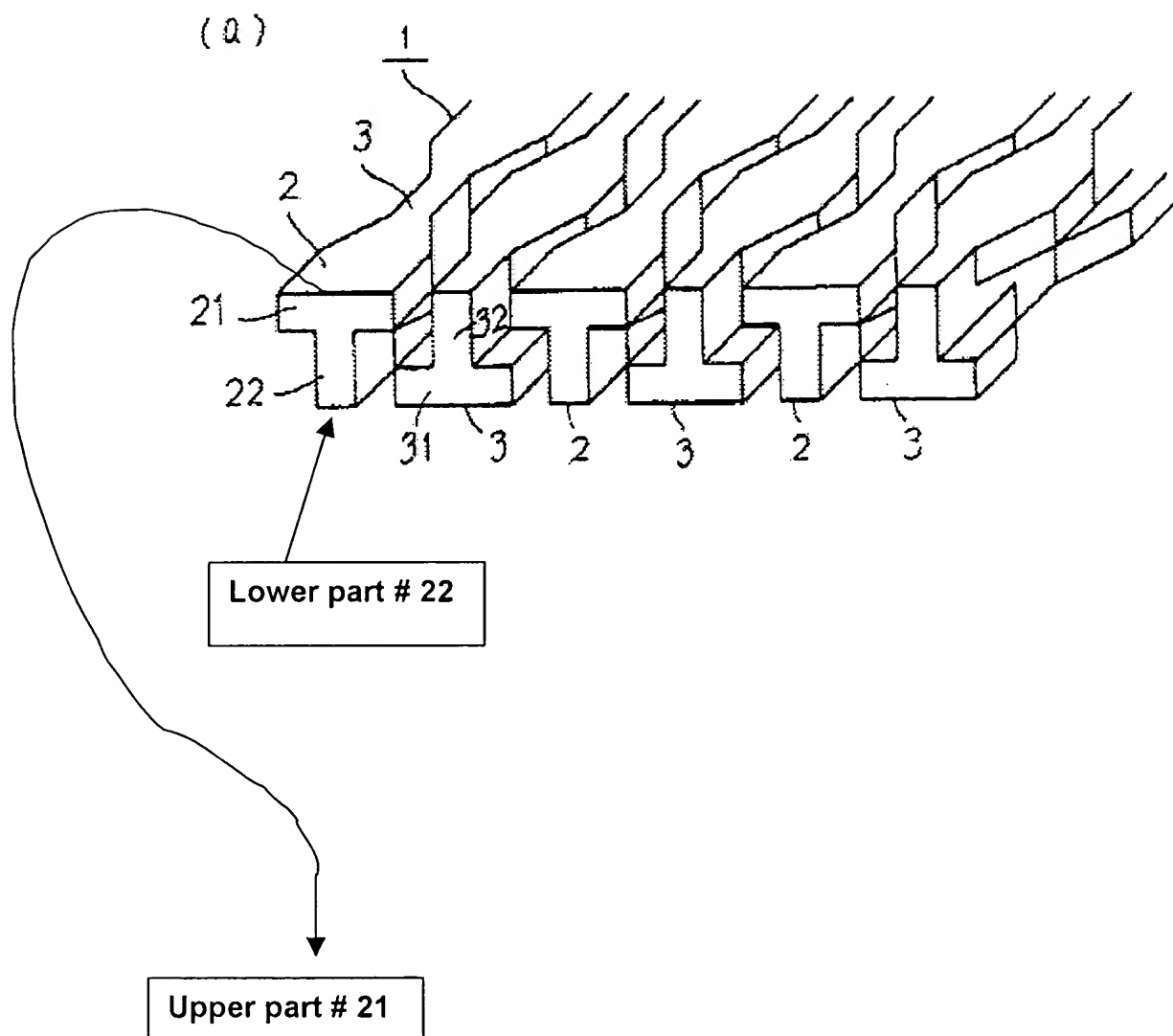
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enhance the positioning margins between the wirings and the layers in a multilayer wiring structure (See abstract).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the device of Park by forming the interconnecting lines having upright cross-section T shapes disposed alternately with interconnecting lines having inverted cross-sectional T shapes because such a forming structure of the interconnecting lines would also obtain high wiring density and would enhance the positioning margins between the wirings and the layers in a multilayer wiring structure, as taught by Matsukawa (See abstract).

Regarding claims 4-5, Matsukawa (Fig. 2a) further discloses that each cross-sectional T shaped interconnecting line 2 (or 3) has an upper part 21 having a first constant width and a lower part 22 having a second constant width, the second constant width differing from the first constant width (see Fig. 2a labeled by the examiner below) (claim 4); and the interconnecting lines 2 in which the upper part 21 is wider than the lower part 22 are disposed alternately with interconnecting lines 3 in which the lower part 31 is wider than the upper part 32 (see Fig. 2a labeled by the examiner below) (claim 5).

FIG. 2A OF MATSUKAWA



Regarding claims 6-7, as discussed above, Matsukawa's Fig. 2a teaches the forming of the upright T shaped interconnecting lines 2 disposed alternately with the inverted T shaped interconnecting lines 3 in order to obtain the T shaped interconnecting line structure which has high wiring density and which can enhance the positioning margins between the wirings and the layers in a multilayer wiring structure (See abstract).

Matsukawa does not disclose that each of the T shaped interconnecting lines (2,3) having the upper part and the lower part equal in heights and equal to one-half of a height of the interconnecting lines.

However, it is noted that the Federal Circuit held that where the only different between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. ***In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), Cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984).*** Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the T shaped interconnecting lines of Matsukawa by forming the upper part and the lower part equal in heights and equal to one-half of the interconnecting lines height because the changes in heights of the upper part and the lower part of the T shaped interconnecting lines would provide the same results of increasing wiring density and enhancing the positioning margins between the wirings and the layers in a multilayer wiring structure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa T. Doan whose telephone number is (571) 272-1704. The examiner can normally be reached on Monday to Friday from 7:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WAEL FAHMY can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Theresa Doan
August 18, 2005.